Association of self-reported pain, fatigue, sleep, exercise, mood and stress in spondyloarthritis: initial analyses from the Project Nightingale study

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Background:

Axial spondyloarthritis (axSpA) is a chronic inflammatory disease primarily affecting the spine and sacroiliac joints, characterised by fluctuating periods of flare and remission. Management is mainly based on patient-reported symptoms and outcome measures collected at follow-up appointments, which may be subject to recall bias.

Smartphone technologies for monitoring disease symptoms provide an opportunity to gain a more complete understanding of disease burden and symptom patterns and may facilitate optimisation and personalisation of axSpA management.

Objectives:

To analyse data collected in the uMotif symptom tracking app and assess correlations between axSpA symptoms.

Methods:

Patients with axSpA attending the Royal National Hospital for Rheumatic Diseases in Bath were invited to participate in the study. Through the uMotif app, patients were sent daily reminders to log pain, fatigue, sleep, recommended exercise, mood and stress using 5-point likert scales.

Between 5th April 2018 and 4th March 2019, 236 patients registered on the app and logged a mean of 85.1 (SD = 91.8) days of data (range = 1 - 317 days). For each patient, a mean score was calculated for each variable over their total logging period. Spearman rank correlation coefficients were used to evaluate inter-variable correlations.

Results:

- Significant correlations were identified between uMotif variables (Figure 1, Table 1), including exercise and sleep, and exercise and mood - supporting existing evidence and recommendations regarding exercise implementation in axSpA.
- Our results also show clear relationships between variables such as mood and stress and disease symptoms such as pain and fatigue.

Figure 1. Correlation matrix for symptoms recorded in the uMotif app. Higher scores indicate 'better' outcomes (e.g. a higher pain score indicates less pain, higher mood score indicates better mood, etc.)

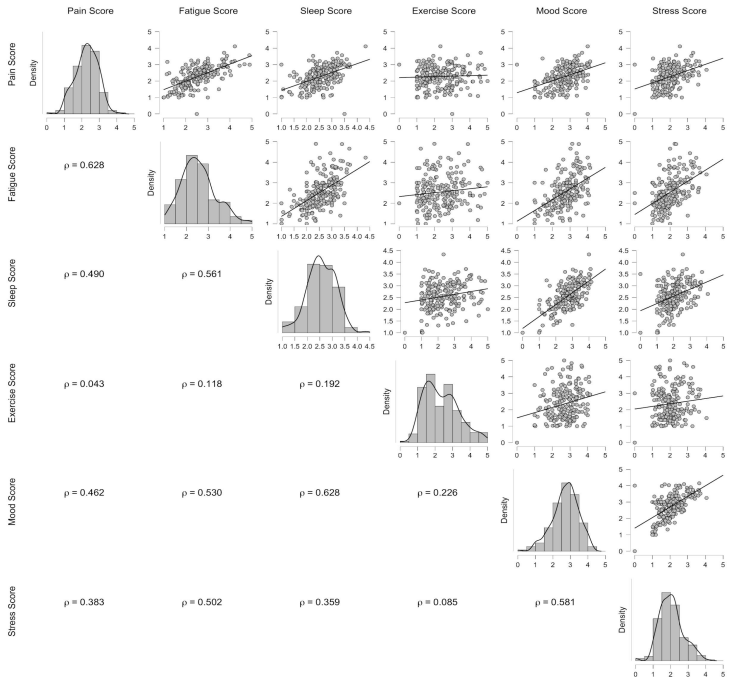

Table 1. Spearman rank correlations of uMotif variables

			Spearman's rho	p values	
Pain Score	-	Fatigue Score	0.628	***	< .001
Pain Score	-	Sleep Score	0.49	***	< .001
Pain Score	-	Exercise Score	0.043		0.537
Pain Score	-	Mood Score	0.462	***	< .001
Pain Score	-	Stress Score	0.383	***	< .001
Fatigue Score	-	Sleep Score	0.561	***	< .001
Fatigue Score	-	Exercise Score	0.118		0.091
Fatigue Score	-	Mood Score	0.53	***	< .001
Fatigue Score	-	Stress Score	0.502	***	< .001
Sleep Score	-	Exercise Score	0.192	**	0.006
Sleep Score	-	Mood Score	0.628	***	< .001
Sleep Score	-	Stress Score	0.359	***	< .001
Exercise Score	-	Mood Score	0.226	**	0.001
Exercise Score	-	Stress Score	0.085		0.222
Mood Score	-	Stress Score	0.581	***	< .001

* p < .05, ** p < .01, *** p < .001

Conclusion:

These findings demonstrate a clear relationship between a variety of patient-reported symptoms in axSpA. In future research, it will be important to determine whether there is a chronological pattern of symptoms within an individual or combination of variables that could predict a flare.

Greater understanding of axSpA disease patterns and identification of the optimal timing of intervention to ameliorate these symptoms may ultimately reduce flare frequency, duration and intensity, and greatly improve the quality of life for patients with axSpA

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